64000

**HP 64000
Logic Development
System**

**Model 64516A
PROM Programmer
Module**

**HEWLETT
PACKARD**

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PACKARD

SERVICE MANUAL

MODEL 64516A
PROM PROGRAMMER MODULE

Printing History

Each new edition of this manual incorporates all material updated since the previous edition. Manual change sheets are issued between editions, allowing you to correct or insert information in the current edition.

The part number changes only when each new edition is published. Vertical bars in a page margin indicate the location of material that is new or changed from the previous edition.

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Chapter 1
GENERAL INFORMATION

WHAT DOES THIS SERVICE MANUAL CONTAIN?

This Service Manual contains information required to install and test the Hewlett-Packard Model 64516A PROM Programmer Module. Operating instructions are provided in a separate operating manual supplied with the PROM Programmer Control board. This manual covers the following model number:

Model 64516A . . . . PROM Programmer Module

SAFETY CONSIDERATIONS TO OBSERVE

This product is a Safety Class 1 instrument (provided with a protective earth terminal) and meets safety standard IEC 348, "Safety Requirements for Electronic Measuring Apparatus"; meets Hewlett-Packard Safety Class I; and has been shipped in a safe condition. The user should review both the instrument and manual for safety markings and instructions before operation. Of particular interest is the " Safety Summary", printed behind the title page of this manual. Additional items of interest are listed below.

WARNING

Do Not Attempt to Disrupt Protective Ground

Any interruption of the power cord protective conductor (third prong of power cord plug) inside or outside the HP 64000 system or disconnection of the protective earth terminal in the power source is likely to make the HP 64000 Logic Development System DANGEROUS! Intentional interruption of the power cord protective conductor is prohibited.

Service and Maintenance - Qualified Personnel Only

Any adjustment, maintenance and repair of the opened instrument may **only** be carried out by **qualified personnel** aware of the **hazards** involved.

Do Not Use If Safety Features Have Been Impaired

If the safety features of the instrument have been damaged or defeated, the instrument shall not be used until repairs are effected which restore the safety features. The safety features of the instrument could be disabled in the following instances:

    a. The instrument shows visible damage.

    b. The instrument fails to perform correct measurements.

    c. The instrument has been shipped or stored under unfavorable environmental conditions. (Refer to Chapter 2 of this manual for information on environmental specifications of storage and shipment.)

HOW IS THIS MANUAL ORGANIZED?

This manual is organized into six chapters.

Chapter 1 contains general information regarding manual applicability, instrument usage, electrical characteristics and equipment requirements.

Chapter 2 explains how to unpack and install the Model 64516A PROM Programmer Module. Furthermore, Chapter 2 gives environmental limits of operation and packing instructions.

Chapter 3 explains performance verification testing and troubleshooting procedures.

Chapter 4 normally contains calibration procedures; however, there are no adjustments for the HP 64516A.

Chapter 5 contains information for ordering a replacement module and other assemblies that are directly replaceable.

Chapter 6 contains instrument and manual change information.

WHAT INSTRUMENTS ARE COVERED BY THIS MANUAL?

The HP 64516A Module is the only instrument fully covered by this manual. The HP 64501A PROM Programmer Control board is part of the PROM programmer subsystem, and is fully covered in its own service manual.

WHAT MANUALS SUPPORT THIS PRODUCT?

The additional manuals supporting the HP 64516A PROM Programmer Subsystem are listed below.

        PROM Programmer Operating Manual . . . . . 64500-90912, February 1984
        PROM Control Board Service Manual . . . . 64500-90911, January 1984

DESCRIPTION OF THE MODEL 64516A PROM PROGRAMMER MODULE

The Hewlett-Packard Model 64516A PROM Programmer provides the interface between the Model 64501A PROM Programmer Control board and the PROM being programmed. The Model 64502A will be needed to run operation performance verification.

CAUTION

The Model 64502A Module is the ONLY module that is used to run performance verification! Operating performance verification on the Model 64516A Module may damage the module. Performance verification should never be run on the HP 64516A PROM Programmer Module!

NOTE

The Model 64516A PROM Programmer Module requires Hewlett-Packard Software with a Version number of 1.06 or greater.

By pressing the *prom_prog* softkey and then selecting the PROM type to be programmed, the PROM Programmer Utility Screen will appear. This screen shows all the different 645XXA PROM Modules, and the PROMs which they are capable of programming. Use this screen as a handy cross reference.

The Model 64516A Module will program the following PROMs:

<div align="center">

AMD 27512

INTEL 27512

INTEL 27513

</div>

NOTES

Chapter 2
INSTALLATION

WHAT DOES THIS CHAPTER CONTAIN?

This chapter contains information for installing and removing a Model 64516A PROM Programmer Module from a development station. Included are initial inspection procedures, preparation for use, and instructions for re-packing the instrument for shipment.

INITIAL INSPECTION OF YOUR NEW PROM PROGRAMMER MODULE

WARNING

To avoid hazardous electrical shock, do not perform electrical tests when there are signs of shipping damage to any part of the unit's outer enclosure.

Inspect the shipping container for damage. If the shipping container or cushioning material is damaged, it should be kept until contents of the shipment have been checked for completeness and the instrument has been checked mechanically and electrically. Procedures for checking electrical performance (operation performance verification) are given in chapter 3.

If there is mechanical damage or defect, or if the instrument does not pass the Performance Tests, notify the nearest Hewlett-Packard Office. If the shipping container is damaged, or if the cushioning material shows signs of stress, notify the carrier as well as the Hewlett-Packard Office. Keep the shipping materials for the carrier's inspection. The HP Sales/Service Office will arrange for repair or replacement at HP option without waiting for claim settlement.

INSTALLING YOUR NEW MODEL 64516A PROM PROGRAMMER

The Model 64516A PROM Programmer Module must be connected to the Model 64501A PROM Programmer Control board. The Model 64501A Control board must be installed into the development station. See Figure 2-1.

The preferred slot for the Model 64501A Control Card is the front-most slot or the second front-most slot if the Model 64941A Floppy Control board is installed. This allows proper cabling of the floppy control and PROM programmer control boards.

NOTE

Installation of a PROM programmer system in the HP 64110A Development
Station is not possible; the necessary voltages are not present in the power
supply.

A 50-pin ribbon cable (HP P/N 8120-4336) connects the Model 64501A PROM Programmer Control board
to the Model 64516A Module. See figure 2-1.

The cable end with the single connector is connected to the Model 64501A PROM Control board; and the
end with the double connector is connected to the HP 64516A PROM Programmer Module.

The cable should be routed across the top of the cardcage and down behind the front panel such that the
two connectors are visible in the opening for the programmer module.

Connect the cable to the PROM Programmer Module using the extreme end of the double connectors.
See figure 2-2.

NOTE

The PROM Programmer cable connectors are keyed. Because of the keying,
they will only fit one way.

⚠️   ⫷ CAUTION ⫸
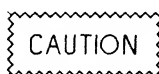
To prevent possible circuit damage to the PROM Programmer and/or PROM
Programmer Control board, turn the development station power OFF before
installing or removing the PROM Programmer Module and/or PROM
Programmer Control board.

Figure 2-1. Installation of the HP 64501A PROM Programmer Control Board
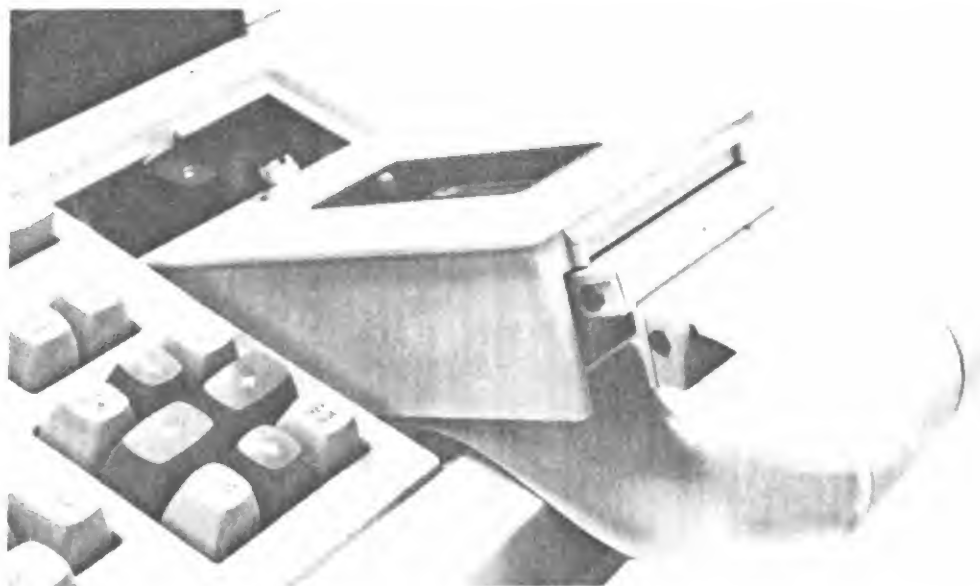
Figure 2-2. Installation of the HP 64516A PROM Programmer Module

OPERATING ENVIRONMENT SPECIFICATIONS

The HP 64516A and HP 64501A may be operated in environments within the following limits:

```
Temperature.......................................................0° to 40° C
Humidity ...................................... 5% to 80% relative humidity
Altitude ............................................ 4 600 m (15 000 ft)
```

It should be protected from temperature extremes which could cause condensation within the instrument.

STORAGE AND SHIPMENT

Storage and Shipment Environment Specifications

The HP 64516A/64501A may be stored or shipped in environments within the following limits:

```
Temperature................................................... -40° to 75° C
Humidity ...................................... 5% to 80% relative humidity
Altitude ........................................15 000 m (50 000 ft)
```

Original Packaging Materials

Containers and packing materials identical to those used in factory packaging are available through Hewlett-Packard offices.

Other Packaging Materials

The following general instructions should be used for re-packing with commercially available materials:

a. Wrap the 64516A PROM Programmer Module in heavy paper or plastic.

b. Use a strong shipping container. A double-wall carton made of 350-pound test material is adequate.

c. Use a layer of shock-absorbing material 70 to 100 mm (3 to 4 inches) thick around all sides of the components to provide firm cushioning and prevent movement inside the container.

d. Seal shipping container securely.

e. Mark shipping container FRAGILE to ensure careful handling.

f. In any correspondence, refer to instrument by model number.

Chapter 3
PERFORMANCE VERIFICATION AND TROUBLESHOOTING

WHAT DOES THIS CHAPTER CONTAIN?

Chapter 3 contains information on initiating performance verification to determine if the HP 64516A PROM Programmer Module, or the HP 64501A PROM Programmer Control board has failed. A HP 64502A PROM Programmer Module is necessary to run performance verification.

> WARNING

Before the instrument is turned on, any extension cords, and devices connecting to it should be connected to a protective earth ground socket. Any interruption of the protective earth grounding will cause a potential shock hazard that could result in personal injury.

⚠

> CAUTION

The Model 64502A PROM Module is the ONLY module that is compatable with the performance verification test! Running performance verification on the Model 64516A PROM Programmer Module may damage the module. Only perform performance verification on the HP 64502A Module.

If your HP 64516A PROM Programmer Module fails, it is considered a throw away component. If the HP 64501A PROM Programmer Control board fails, it is available through the Hewlett-Packard Corporate Parts Center by Bluestripe Exchange. Troubleshooting is structured to help you determine whether the Model 64516A has failed through performing performance verification on the Model 64502A PROM Programmer Module (THE ONLY MODULE CAPABLE OF RUNNING PERFORMANCE VERIFICATION).

PERFORMANCE VERIFICATION (PV) BACKGROUND INFORMATION

In a HP 64000 system that is either networked (hard disk based) or stand-alone (floppy disk based), the performance verification (PV) software for the HP 64502A PROM Programmer Module and the HP 64501A PROM Programmer Control board is a subset of the option_test PV. Option_test PV tests all possible option modules that can be configured in the HP 64100A cardcage.

The following procedures explain how to run performance verification on the HP 64501A/64502A PROM Programmer subsystem for both a networked and a stand-alone configuration.

Hardware Configuration Needed to Perform PV Testing

The hardware needed to run the HP 64501A/64502A Performance Verification tests is:

HP 64502A PROM Programmer Module
HP 64501A PROM Programmer Control board

Software Configuration Needed to Perform PV Testing

If the HP 64000 system is configured to be a stand-alone system (floppy disk based), then the following software modules must be contained on the local mini disc system (on the mini disc which is inserted into the 64000 mini disc drive 0 or 1):

FLOPPY_OP_SYS
OPTION_TEST
PV_PROM_PROG

Other software modules will be necessary to perform system functions other than HP 64501A/64502A Performance Verification.

If the HP 64000 is in a system configuration (hard disc based), then the following software modules must be loaded onto the hard disc:

OPTION_TEST
PV_PROM_PROG

PROCEDURE TO RUN PERFORMANCE VERIFICATION

The following procedure describes how to run performance verification. Performance verification will test the operation of the HP 64501A PROM Programmer Control board through the HP 64502A PROM Programmer Module. For convenience, figures 3-1 and 3-2 will show in order each screen that will appear on the HP 64000 display as the performance verification procedure below is followed.

For an explanation of each performance verification softkey used during performance Verification, refer to the "PV Softkey Descriptions" following this procedure.

In order to run HP 64501A Performance Verification, the following criteria must be met:

The HP 64501A PROM Programmer Control board must be connected to the HP 64502A PROM Programmer Module.

The HP 64501 PROM Programmer Control board must be installed into the HP 64000 Development Station.

See chapter 2 for complete installation procedures.

Procedure to Perform the HP 64501A/64502A Performance Verification

NOTE

If a PROM programming failure is apparent (i.e., you can not successfully program or verify a particular PROM chip), try programming several new PROM chips before performing the following procedure **(time saver)**.

a. Turn ON the HP 64000 Development Station. The "STATUS: Awaiting command" screen should appear.

b. Press the ---*ETC*--- softkey until the *opt_test* softkey appears.

c. With the operating system initialized and awaiting a command, use the *opt_test* softkey or manually type the lower case command:

option_test   followed by (RETURN)

The performance verification will now display a directory of the installed option boards and their card slot positions. See figure 3-1.

d. Locate the PROM Programmer (ID # 1000H) and enter the card slot number.

For example, in figure 3-1 the HP 64501A PROM Programmer Control board is in card slot 1. Therefore, enter:

1   followed by (RETURN)

The performance verification test display, figure 3-2, shows the tests which will be executed.

e. Press the *cycle* softkey to execute the tests.

Note the Supply Adjust test. This test will not be executed. The procedure that uses the Supply Adjust test is found in the HP 64501A PROM Programmer Control board service manual.

Each test category is executed and the results are displayed. A complete cycle requires approximately 1 second. To stop the testing, press the *cycle* softkey again or the *end* softkey.

f. When the tests are complete, examine the # Fail colomn.

When all entries are zero, it indicates that 85% of the circuit nodes have been checked and no errors have been found.

To test 99% of the circuit nodes, the Supply Adjust test must also be performed. **Only qualified service personel should perform this procedure!** This procedure is described in the HP 64501A PROM Programmer Control board service manual.

Procedure to Perform the HP 64501A/64502A Performance Verification (Cont'd)

A non-zero value indicates that a subtest failure was detected in that test category.

If all the performance verification tests pass, then the HP 64501A PROM Programmer Control board is operating. This indicates that since the HP 64501A PROM Programmer Control board is operating with a HP 64502A Module, the failure lies with the HP 64516A PROM Programmer Module.

Before discarding the HP 64516A, test it again with some new PROMS. Occasionally a bad PROM or batch of PROMs can make you believe it is the PROM programmer that has failed when it is only a defective PROM.

h. To terminate execution of performance verification testing, while in the performance verification test display, press the *end* softkey. This returns you to the option_test Performance Verification card cage listing. Press the *end* softkey aqain to return to the main display.

CAUTION

The proper operation of the positive PROM programmer requires that a PROM be inserted ONLY AFTER the PROM programmer software module is called, and the PROM be REMOVED before the PROM programmer software module is exited.

NOTE

The PROM software module is called by pressing the *prom_prog* softkey followed by the RETURN key. To exit the PROM programmer software module, press the *end* softkey followed by the RETURN key.

PERFORMANCE VERIFICATION (PV) SOFTKEY DESCRIPTIONS

If further information is needed about results of each test, or you wish to execute only an individual test repeatedly, then softkeys must be used to bring up the appropriate test display and begin test execution. The softkeys have the following actions:

[cycle]   Causes the Performance Verification software to execute each test on the display in turn; the inverse video bar will highlight each test as the test is executed.

[disp_test]   When this softkey is pressed, the subtest display for the test highlighted by the inverse video bar is put on screen. This subtest display shows the status information of the subtest.

[end]   This softkey, when pressed at the Performance Verification overview level, causes the testing to terminate at the end of the current cycle and return to the option_test card slot listing. When *[end]* is pressed at this level, the performance verification software is exited entirely and the system is returned to the awaiting command status.

[exit_test]   This softkey, when pressed in the subtest display level, ends test execution at the end of the current cycle and returns the Performance Verification software to the next higher test level.

[next_test]   Causes the inverse video bar to move to and highlight the next test name on the test display.

[option_test]   Causes the operating system to load the Performance Verification software and begin execution; the option_test card slot listing is displayed.

[print]   Causes all the information above the status line on the current test display to be copied to the system printer, if one is connected. The copy will not be done until the end of the current test cycle, if testing is in progress.

<SLOT #>   Pressing this softkey while in the option_test card slot listing causes the system to prompt you for the slot number of the option board you wish to test.

[start]   Begins repeated execution of the test highlighted by the inverse video bar.

Figure 3-1. Option Test Awaiting Command

Figure 3-2. PROM Programmer Performance Verification

Chapter 4
ADJUSTMENTS

WHAT DOES THIS CHAPTER CONTAIN?

This chapter normally contains adjustment procedures. The Model 64516A PROM Programmer Module has no adjustments.

NOTES

Chapter 5
REPLACEABLE PARTS

WHAT DOES THIS CHAPTER CONTAIN?

This chapter contains information for ordering parts. Table 5-1 lists the abbreviations used in the parts list and throughout the manual. Table 5-2 list all replaceable parts in reference designator order.

WHAT ARE EXCHANGE ASSEMBLIES?

The Model 64516A is a throw away module. A new module is available through Hewlett-Packard Corporate Parts Center.

ABBREVIATIONS USED IN THIS MANUAL

Table 5-1 lists abbreviations used in the parts list and throughout the manual. In some cases, two forms of the abbreviation are used: one all in capital letters, and one partial or no capitals. This occurs because the abbreviations in the parts list are always capitals. However, in the other parts of the manual, other abbreviation forms are used with both lowercase and uppercase letters.

REPLACEABLE PARTS LIST

Table 5-2 list replaceable parts and is organized as outlined below:

    a. Chassis--mounted parts in alphanumerical order by reference designation.

    b. Electrical assemblies and their components in alphanumerical order by reference designation.

    c. Miscellaneous parts.

The information given for each part consists of the following:

    a. The Hewlett-Packard part number and the check digit.

    b. The total quantity (Qty) in the instrument.

    c. The description of the part.

The total quantity for each part is given only once--at the first appearance of the part number in the list.

ORDERING INFORMATION

To order a part listed in the replaceable parts table, quote the Hewlett-Packard part number and check digit, indicate the quantity required, and address the order to the nearest Hewlett-Packard Office.

To order a part that is not listed in the replaceable parts table, include the instrument model number, instrument repair number, the description and function of the part, and the number of parts required. Address the order to the nearest Hewlett-Packard Office.

DIRECT MAIL ORDER SYSTEM

Within the USA, Hewlett-Packard can supply parts through a direct mail order system. Advantages of using the system are as follows:

a. Direct ordering and shipment from the HP Parts Center in Mountain View, California.

b. No maximum or minimum on any mail order (there is a minimum order amount, for parts ordered through a local HP office when the orders require billing and invoicing).

c. Prepaid transportation (there is a small handling charge for each order).

d. No invoices--to provide these advantages, a check or money order must accompany each order.

Mail-order forms and specific ordering information are available through your local HP office. Addresses and phone numbers are located at the back of this manual.

Table 5-1. Reference Designators and Abbreviations

REFERENCE DESIGNATORS

A	assembly	F	fuse	MP	mechanical part	U	integrated circuit
B	motor	FL	filter	P	plug	V	vacuum tube, neon
BT	battery	IC	integrated circuit	Q	transistor		bulb, photocell, etc
C	capacitor	J	jack	R	resistor	VR	voltage regulator
CP	coupler	K	relay	RT	thermistor	W	cable
CR	diode	L	inductor	S	switch	X	socket
DL	delay line	LS	loud speaker	T	transformer	Y	crystal
DS	device signaling (lamp)	M	meter	TB	terminal board	Z	tuned cavity network
E	misc electronic part	MK	microphone	TP	test point		

ABBREVIATIONS

A	amperes	H	henries	N/O	normally open	RMO	rack mount only
AFC	automatic frequency control	HDW	hardware	NOM	nominal	RMS	root-mean square
AMPL	amplifier	HEX	hexagonal	NPO	negative positive zero zero temperature coefficient	RWV	reverse working voltage
		HG	mercury				
BFO	beat frequency oscillator	HR	hour(s)				
BE CU	beryllium copper	HZ	hertz	NPN	negative-positive-negative	S-B	slow-blow
BH	binder head					SCR	screw
BP	bandpass			NRFR	not recommended for field replacement	SE	selenium
BRS	brass	IF	intermediate freq			SECT	section(s)
BWO	backward wave oscillator	IMPG	impregnated	NSR	not separately replaceable	SEMICON	semiconductor
		INCD	incandescent			SI	silicon
CCW	counter-clockwise	INCL	include(s)			SIL	silver
CER	ceramic	INS	insulation(ed)	OBD	order by description	SL	slide
CMO	cabinet mount only	INT	internal	OH	oval head	SPG	spring
COEF	coefficient			OX	oxide	SPL	special
COM	common	K	kilo = 1000			SST	stainless steel
COMP	composition					SR	split ring
COMPL	complete	LH	left hand	P	peak	STL	steel
CONN	connector	LIN	linear taper	PC	printed circuit		
CP	cadmium plate	LK WASH	lock washer	PF	picofarads = 10^{-12} farads	TA	tantalum
CRT	cathode-ray tube	LOG	logarithmic taper			TD	time delay
CW	clockwise	LPF	low pass filter	PH BRZ	phosphor bronze	TGL	toggle
				PHL	phillips	THD	thread
DEPC	deposited carbon	M	milli = 10^{-3}	PIV	peak inverse voltage	TI	titanium
DR	drive	MEG	meg = 10^6	PNP	positive-negative-positive	TOL	tolerance
		MET FLM	metal film			TRIM	trimmer
ELECT	electrolytic	MET OX	metallic oxide	P/O	part of	TWT	traveling wave tube
ENCAP	encapsulated	MFR	manufacturer	POLY	polystyrene		
EXT	external	MHZ	mega hertz	PORC	porcelain	U	micro 10-6
		MINAT	miniature	POS	position(s)		
F	farads	MOM	momentary	POT	potentiometer	VAR	variable
FH	flat head	MOS	metal oxide substrate	PP	peak-to-peak	VDCW	dc working volts
FIL H	fillister head	MTG	mounting	PT	point		
FXD	fixed	MY	mylar	PWV	peak working voltage	W/	with
						W	watts
G	giga (10⁹)	N	nano (10⁻⁹)	RECT	rectifier	WIV	working inverse voltage
GE	germanium	N/C	normally closed	RF	radio frequency		
GL	glass	NE	neon	RH	round head or right hand	WW	wirewound
GRD	ground(ed)	NI PL	nickel plate			W/O	without

The PROM Cable is not part of the Model 64516A PROM Programmer Module.

The PROM Cable is a part of the 64500S PROM Programmer Subsystem.

Figure 5-1. Model 64516A PROM Programmer Module Being Installed

Table 5-2. Replaceable Parts

REFERENCE DESIGNATOR	HP PART NUMBER	CD	QTY	DESCRIPTION
A1	64516A	5	1	PROM PROGRAMMER MODULE

NOTES

Chapter 6
INSTRUMENT AND MANUAL CHANGES

WHAT DOES THIS CHAPTER CONTAIN?

This chapter normally contains information required to backdate the manual to earlier versions of the instrument. Since the manual applies directly to the only version of the Model 64516A existing, no backdating information is necessary.

NOTES